WEB-BASED ELECTRONIC OPERATION LOG SYSTEM - ZLOG SYSTEM

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Abstract

Zlog system, an electronic operation log system based on Zope, has been used since January 2004 at the KEKB and PF-AR accelerator facilities at KEK.

Zope* is a Web content management system, which is based on several open source software components like Python and PostgreSQL. It enabled us to develop our Zlog system in a short period, because the Zope system includes a development framework for Web Application Server. The Zlog system was introduced also to J-PARC/KEK-JAEA and RIBF/RIKEN, based on the experiences at KEKB and PF-AR. The Zlog system was proved to be quite portable even under different computer architectures. The Zlog system at KEKB accumulates about 1.5 million event entries so far, and screenshot images taken during the operation can be stored and viewed as well with entries. In this paper, we describe the present status and component details of the Zlog system.

INTRODUCTION

KEKB [1] operational logbook was based on notebook entry until summer, 2002. Afterwards, An electronic operation log system built in MS-ACCESS/MS-SQL was used from autumn, 2002 to winter, 2003. [2]

In the MS-ACCESS-based log system, most of entries have to be typed by hand. Because operators are usually devoted to beam tuning, they cannot spare much time to data entries. In summer, 2003, KEKB control group examined automatic entry of operation log (electronic operational logbook) records for shortening time of the logbook entry. In those days, we have already established the technology of automatic entry into Unix files of the operation content. [3]

The addition of the function to import data from the file automatically to the MS-ACCESS-based log system was examined at first, but it was estimated that a development period was prolonged. Therefore in late years we started the new development of an operation log system based on Zope which technology development was advancing rapidly.

Because Zope is Python based Web Application Server that RAD (Rapid Application Development) is easy, it was estimated that we, who learn Python language, could complete development of the operation log in short term.

The Zlog system started use formally from winter, 2004.

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ZLOG SYSTEM STRUCTURE

Zlog system consists of Zlog Core, PostgreSQL and Log Monitor Server. Zlog Core is a web-based application to browse and edit operation log records. All records of the operation log are stored in PostgreSQL, which is backend database server. Log Monitor Server monitors some events and automatically records them into the logbooks. We report each subsystem in the following subsections.

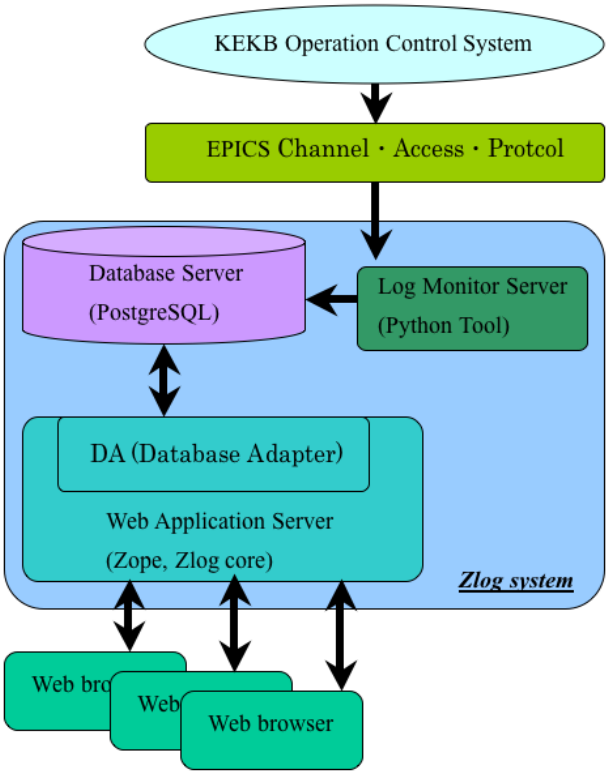

Figure 1:Zlog system.

Database Server - PostgreSQL

Our requirements of the database subsystem are capability of handling large quantity of data, stable operation, and good management system to ease construction and maintenance. We also planed that several kinds of operation logs would be constructed in a Zlog system. Taking them into account, we introduced PostgreSQL with succession function.

The operation log of KEKB has 1.5 million event entries, but works lightly now. We can setup another

PostgreSQL server for behaviour test without additional cost because PostgreSQL is free software.

Log Monitor Server

Log Monitor Server monitors operation data from machinery, and then inserts them into the PostgreSQL. The data are received through EPICS (Experimental Physics and Industrial Control System) channel access protocol. The Log Monitor Server converts the data into the character string with appropriate format before insertion.

Web Application Server - Zope

Zope is a tool to develop Web Application. User can browse and enter data with user interface of Web Application. Zope has following feature.

- The development itself is also possible through Web.
- It Includes function of Web Server.
- Easy to handle Japanese character in multi-platform.

In Zope, there is an object called "product", which is a kind of template of the application. Following two products are major components of Zlog system.

- DA-Zope product
  DA is one of the products of the Zope. Data exchange between the Zope and the PostgreSQL is performed through DA (Database Adapter).
- Zlog core
  The Zlog core is a Web Application for the operation log using Web Application development function of Zope. Users perform entry of data, editing, and browsing the operation log through user interfaces of this Application with Web browser.

ZLOG CORE

Here, we briefly explain about development of interface of Zlog core. To access Zlog system, we can use any terminal in which a Web browser is installed.

Each interface can be accessed by typing its URL in the Web browser. We can use these user-interfaces wherever PC-terminal is available in the KEK.

Edit Interface

Figure 2 shows a screen copy of Edit Interface, which is a user interface for manual entry and to edit operation log records. In this interface latest records (max 48 hours from now) are displayed. In addition, the insertion to the operation log of a screenshot image is possible. Time range of the display can be chosen by the menu, which is indicated "Latest Time Setting" in Figure 2. The display is automatically updated to show the latest entries. To prevent modification of records more than 2 days ago, limit of the time range is imposed. To edit older entries than 2 days, permission by the manager is necessary.

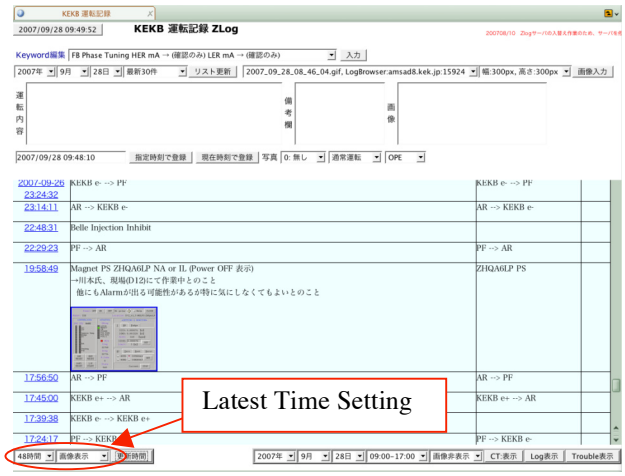

Figure 2: Edit Interface.

Viewer Interface

Figure 3 shows a screen copy of Viewer Interface, which is a user interface to browse an operation log. When user selects date and time (in unit of 8-hours-shift) using "Select Date" pull down menus, and then push "LOG DISPLAY" button, all entries of the selected date and time are displayed. User can choose any date without restriction. User cannot edit entries in Viewer Interface. Display of the entries is automatically updated.

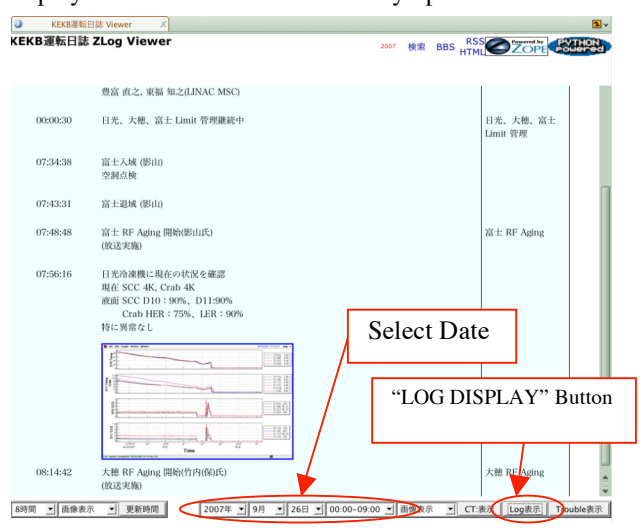

Figure 3: Viewer Interface (Single).

Figure 4 shows another type of Viewer Interface, which displays multiple operation logs in single list. For example, log entries of PFAR is shown with khaki background and ones of KEKB is shown with azure background in Figure 4. User can select viewing condition with menus and buttons in the upper part of the window. Automatic update is not available in this interface.

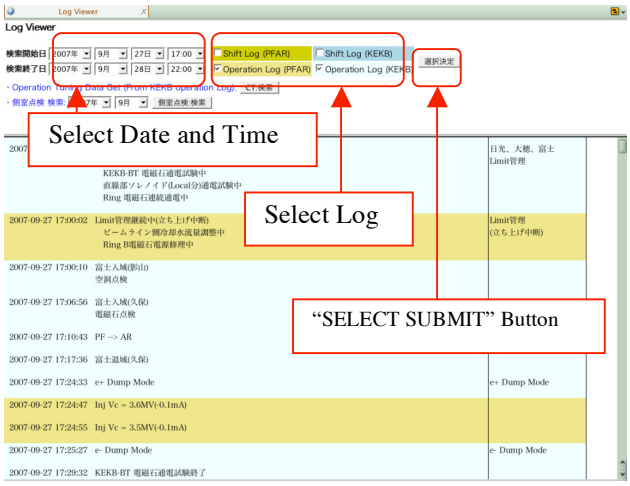

Figure 4: Viewer Interface (Multi).

Search Interface

Figure 5 shows a screen copy of Search Interface, which is a user interface to search operation log records. Keyword search is possible. User can choose any date without restriction.

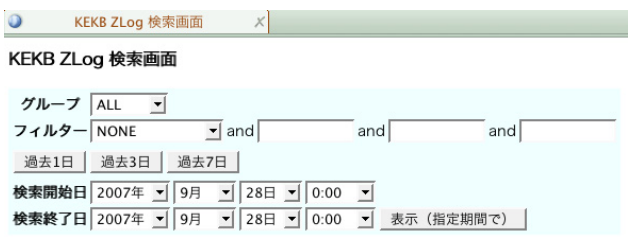

Figure 5: Search Interface.

THE MERITS OF ZLOG SYSTEM

The automatic entry of the operation log records has been achieved by introducing Zlog system. In addition, we obtain following advantages.

- Users can browse and edit operation log wherever network terminal is available. Development of Web Application is also possible from the network terminal.
- Little dependency of OS of the network terminals.
- Because development itself is done in Web Server, no additional procedure such as data conversion is necessary to publish on Web.
- The Zlog system is object oriented, it is superior in Serviceability.

Because the Zlog system has flexible expansibility, the Zlog system has been introduced to J-PARC, RI-beam of RIKEN, and Vacuum System Management at KEK. Therefore we have been developing each part of the Zlog system to be portable. It takes only a few days for porting till we operate it from scratch.

It took 2.5 months to develop Zlog core in parallel with learning Zope. It includes the following items.

- To learn structure, usage, and technical details of Zope, it took about 1.5 months.
- To develop user interfaces using HTML and CSS, it took about 1 month.

The development of the first version of Zlog system, which had minimum functions though, had completed in short term than we thought. Afterwards, the Zlog system has been updating from time to time. Skill up of the developer is also in progress.

ACKNOWLEDGMENTS

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